ENERGY FROM THE ARCTIC: FACTS AND ISSUES

A Brief Summary

JUDITH MAXWELL

Pam:622.323:(*40) MAX c.2

Canadian-American Committee

SPONSORED BY

C. D. HOWE RESEARCH INSTITUTE (CANADA)
NATIONAL PLANNING ASSOCIATION (U.S.A.)

POLAR
PAM
4385

POLARPAM

Printed in Canada

BOREAL INSTITUTE
LIBRARY

CONTENTS

PAGE

1. Introduction 1
The U.S. Energy Shortage 2
Canada's Limited Energy Resources 6
Canada's "New" Approach to Energy Development 8

2. Exploration: The Hunt for Elephant-Sized Gas and Oil Fields 15
The Short History of Arctic Exploration 17
The 1960 Land Regulations 19
Exploring the Islands 20
Discoveries in the Delta 22
The Economics of Elephant-Hunting 24

3. Transportation Systems: The Engineering Challenge 29
The Nature of the Arctic Challenge 29
Conventional Approaches to Arctic Transportation 31
Novel Approaches to Unique Arctic Problems 40

4. Arctic Frontiers: The People and the Land 47
Native Interests 47
Land Protection 53
Risks Inherent in Arctic Development 58

5. Transportation Permits: The Role of Government 63
The Regulation of Arctic Transportation 64
The Structure of Decision-Making in Canada 65
Processing a Pipeline Application 67
Regulatory Issues in Canada 72

6. Pipeline Construction: Assessing the Benefits and Costs 79
Defining the National Interest 80
The Search for $5 Billion 85
The Great Construction Project 89
The Side-Effects of Construction 93

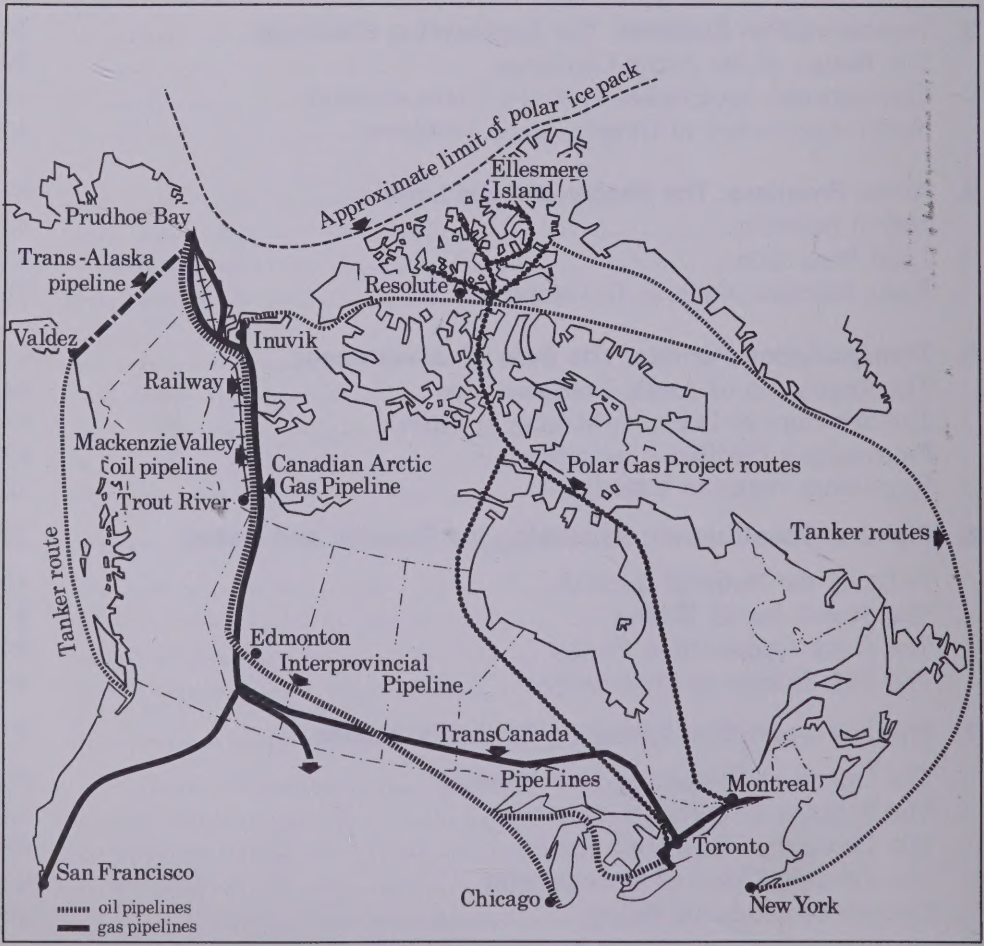
7. Pipeline Operation: Managing Canada's Wealth 95
The Option of Postponing Development 96
The Benefits of Early Development 98
The Concept of Economic Rent 99
The Potential Costs of Development 102
Options on Industrial Policy 110

8. North American Relations: Striking a New Balance 113
Recent Developments in Canada-U.S. Relations 113
The Differences in National Goals 114
Mutual Interests in Energy 115
The Exchange Rate Question 116
The Pricing Issue 118
Conclusions 119

Rec'd: Jan 17/80
Order No.:
Price: Gift
Acc. No.: Dr. Fuller .

38288

Proposed Transportation Systems for the Arctic



ENERGY FROM THE ARCTIC: FACTS AND ISSUES

A Brief Summary

Chapter 1. Introduction

The United States is running short of energy. Production and distribution systems are stretched to the limit, and still the country must import increasing amounts of crude oil and natural gas. The President has introduced long-term measures intended to encourage the development of new sources of energy, and he has indicated that the government will remove the regulations from natural gas prices and allow them to rise to free market levels. Further measures are expected to encourage long-term development of domestic supplies, but there is little that the United States can do to meet its immediate requirements except to import more and to ration the supplies that are available.

There are abundant supplies of oil and natural gas elsewhere in the world, particularly in the Middle East, but the United States would prefer to diversify its sources of fuel and to rely on imports from stable sources such as Canada. There is therefore an incentive to develop new supplies in such remote areas as the Arctic. However, it may take ten years or more to open up the new regions and to build the transportation systems needed to carry the energy to the United States.

Canada is not suffering from such serious energy shortages, but its oil and gas wells in the accessible regions in Alberta and the other provinces are now producing at close to capacity. Exploration for new wells in these provinces has not been successful in recent years, leading the Canadian government to take steps to conserve adequate supplies for Canadian users. One of these moves was the decision taken in February, 1973, *not* to increase exports of oil or natural gas until major new sources of energy are found.

There have been some exciting discoveries of natural gas in the Canadian Arctic, but geologists do not know yet how much oil or natural gas is there. However, Canadian Arctic Gas Pipeline Company Limited has formed a consortium of twenty-seven companies (of which sixteen are major American producers and distributors of natural gas) to build a gas pipeline from the Mackenzie Delta and Prudhoe Bay to markets in the south. This $5-billion project would deliver 4 billion cubic feet of natural gas per day, which would, if it were all sold to the United States, nearly double Canada's exports. Despite its size, however, this pipeline would supply only 6 percent of U.S. needs for natural gas in 1980. Canada currently supplies 7 percent of the U.S. oil market and 4 percent of its natural gas. If all the possible Arctic projects were to go ahead quickly, Canada's share of the U.S. market would increase slightly to 9 percent for both oil and natural gas in the early 1980s.

Clearly, Canada is in no position to cure, or even ease significantly, the current U.S. energy shortages. Yet Americans are anxious to speed up development of the Canadian Arctic and bring new gas to markets in the midwest, which relies heavily on Canadian fuels. Canadians are hesitant about encouraging the project, for three reasons:

- Canada may need that natural gas itself during the 1980s, unless there are more major finds;
- Construction and operation of such a large pipeline could have major repercussions on the Canadian economy;
- Nationalists resent the prospect of another huge American-oriented pipeline spanning the country.

Chapter 2. The Hunt for Elephant-Sized Gas and Oil Fields

The first problem in getting energy from the Arctic is to find enough to justify producing it. Geologists became interested in the Canadian Arctic only during the 1950s. Exploration proved to be so risky and so expensive that in 1967 a group of small companies with land rights in the Arctic Islands formed a joint venture called Panarctic Oils Ltd. The Canadian government put up 45 percent of the money and is still the largest single shareholder. Panarctic has now made five major natural gas discoveries in the islands. Exploration on the mainland was not vigorously pursued until 1968, when the industry struck the huge oil field at Prudhoe Bay on the North Slope of Alaska. This triggered a major land rush to the Mackenzie Delta region, and within three years there were several major natural gas strikes in the Delta. However, there have been relatively few oil discoveries, so the industry is now preparing to extend the drilling out into the stormy waters of the Beaufort Sea.

By 1973 the industry had found enough natural gas in the Delta to encourage the Arctic Gas consortium to push ahead with its pipeline preparations. In fact, three companies which have found natural gas have signed contracts with major U.S. transmission companies, promising to sell them 23 trillion cubic feet of natural gas if the pipeline is built and export permits are granted.

The lure that has drawn the companies into expensive Arctic exploration (it costs between $2 million and $3 million to drill each well) is profits. The fields in the Arctic appear to be large — even elephant-sized. This means that the companies investing millions of dollars in developing the fields expect the operations to be far more productive than the average field in Texas or Alberta. This in turn means that the cost of producing each barrel of oil or cubic foot of gas is low compared to the cost in conventional areas. The companies that find the big fields should therefore earn substantial profits. Geologists believe that the Canadian Arctic has great potential, and the hunt is still on for more elephant-sized natural gas and oil fields.

Chapter 3. Transportation Systems: The Engineering Challenge

Northern terrain presents formidable new challenges to the engineers designing transportation systems to bring energy from the Arctic. The combination of the climate, ice-packed seas, and permanently frozen ground means that no conventional forms of transportation can be directly transplanted to the north.

Order Form for Canadians

C. D. Howe Research Institute
2060 Sun Life Building
Montreal, Quebec, Canada H3B 2X7

Please send me __________ copy/copies of *Energy from the Arctic: Facts and Issues* at $4.00 a copy.

My cheque for $__________ is enclosed.

____

____

____

____

Order Form for Americans

National Planning Association
1606 New Hampshire Avenue, N. W.
Washington, D. C. 20009

Please send me __________ copy/copies of *Energy from the Arctic: Facts and Issues* at $4.00 a copy.

My cheque for $__________ is enclosed.

____

____

____

____

Order Form for Canadians

C. D. Howe Research Institute
2064 Sun Life Building
Montreal, Quebec, Canada H3B 2X7

Please send me .... copy/copies of *Energy from the Arctic: Facts and Issues* at $4.00 a copy.

My cheque for $.............. is enclosed.

____

____

____

Order Form for Americans

National Planning Association
1606 New Hampshire Avenue, N.W.
Washington, D.C. 20009

Please send me .... copy/copies of *Energy from the Arctic: Facts and Issues* at $4.00 a copy.

My cheque for $.............. is enclosed.

____

____

____

____

Many systems are being examined, including such novel approaches as nuclear submarine supertankers, giant resource-carrying aircraft, and a railway. However, most of the development research has gone into natural gas and oil pipelines and supertankers, which are more easily adapted to the northern climate. The pipelines appear to have the advantage in carrying natural gas, and possibly oil, over the mainland. But different systems may be needed to get either gas or oil out of the Arctic Islands, where pipelines would run into difficulties crossing the deep, treacherous waters between the islands (see map).

The one thing these modes have in common is that they are expensive to build in the Arctic. Any transportation system will have to be designed on a large scale to take advantage of economies of scale and thereby keep transportation costs within reason. But geologists must find large quantities of gas and oil before work can go ahead on any of these transportation systems.

Chapter 4. Arctic Frontiers: The People and the Land

Any Arctic transportation system will cause a major intrusion into the northern wilderness by industrial society. This means that many of the twenty-seven thousand Indian and Eskimo people living in northern Canada will be forced to adapt to a new way of life and that the ecological systems of the Arctic will be affected by exploration and construction.

The native people in northern Canada have claimed compensation for the loss of the use and occupancy of their traditional lands. Three native organizations are involved: the Yukon Indian Brotherhood is now negotiating with the federal government; the Inuit Tapirisat of Canada, representing the Eskimo people, is still preparing its land claims; and the Northwest Territories Indian Brotherhood is pursuing a court case against the government, laying claim to lands in the Mackenzie Valley. (Many of these Indians are covered by treaties signed fifty or more years ago but never implemented.) The government admits that it owes compensation to all three groups, but it refuses to acknowledge that the native people have an "aboriginal claim" to the land. (The United States has already reached a settlement with the native people living in Alaska.)

Scientists employed by industry and government have spent three years trying to learn more about Arctic ecological systems so that they can help to design suitable transportation systems. The Canadian government has also passed three laws governing the use of the land and waterways in the north and providing penalties for activities that disturb the environment unduly. There is still some dispute within the scientific community about whether the experts have actually learned enough to protect the wilderness. It seems clear, however, that development will introduce, or aggravate, at least six environmental threats: the intrusion of outsiders; problems of waste disposal; oil or gas spills; stream crossings; a shortage of gravel; and aesthetic changes to the wilderness. In many cases, the governments involved will have to balance one environmental risk against another: For example, in choosing the pipeline route from Prudhoe Bay to the Mackenzie River, they will have to choose between the coastal route, which goes through the caribou calving grounds, and the interior route, which passes through the Old Grow Flats, a vital fur-trapping area and the only known denning site of the grizzly bear.

Chapter 5. Transportation Permits: The Role of Government

No construction project can proceed in the Arctic without permission from the governments involved. Permits are required to allow construction of a pipeline and also to allow the export or import of energy.

The process of getting these permits is long and complicated. Companies wanting to build a pipeline or to export and import gas must submit a detailed application to the appropriate regulatory agencies. (The Arctic Gas application, which will be submitted in late 1973 or early 1974, is expected to stand six feet high.) Then the agencies — the Federal Power Commission (FPC) in the United States and the National Energy Board (NEB) in Canada — hold extensive hearings where interested parties are allowed to ask questions and present evidence. Then the agency must decide whether the project proposed is "in the public interest." The U.S. government agencies must also prepare an environmental impact statement for the Alaskan section. In Canada, the NEB decision must be referred to Cabinet, where the final decision is made.

In the past, regulatory proceedings have led to serious delays for companies proposing such projects: Alyeska Pipeline Service Company has already waited for four years for permission to build a line across Alaska from Prudhoe Bay to Valdez; TransCanada PipeLines Limited also had to wait for some years for permits in the 1950s. Already questions are being asked about whether the government decision-making process in Canada can handle the forthcoming applications effectively. The main problems concern an awkward division of powers among agencies and the old-fashioned mechanisms for hearing applications.

Chapter 6. Pipeline Construction: Assessing the Benefits and Costs

Arctic Gas is proposing to build a $5-billion pipeline across Canada — a country whose gross national product will amount to about $170 billion in the late 1970s. Construction of such a large project could have major repercussions on financial markets, employment, incomes, inflation, and industrial output in Canada. Economists are testing the impact of the pipeline by building econometric models. But it is clear, even without using a model, that the impact will depend critically on the state of the economy at the time construction begins. If the country were in a recession, for example, the pipeline would be a welcome stimulus to economic activity; but if Canada were in an economic boom at the time, then the pipeline could place enormous strains on production capacity, financial markets, the balance of payments, and the rate of price increases.

The government has not laid down any guidelines for assessing the economic impact of the pipeline. This study suggests two: that the benefits to Canadians in terms of wages, interest, dividends, and taxes should be larger than the costs (economic, social, and environmental); and that the pipeline should strengthen Canada's economic base.

One of the key factors in the economic impact will be the effect of the pipeline financing on the Canadian exchange rate. This will be determined by the amount of financing done in Canada; by the size of other major resource projects being financed and built at the same time; and by the state of the financial markets when Arctic Gas goes to market.

If Canadian companies bid successfully for contracts to supply the steel, machinery, and turbines needed on the pipeline, the benefits to Canada during the construction phase could be substantial — in terms of both jobs created and incomes earned. But there will undoubtedly be some dislocations created for other industries. These include such problems as shortages of steel, unstable capital markets, a higher exchange rate, and increased inflation. The major problem will be whether the economy can adjust easily to a three-year burst of construction activity. Will the economy slide into a recession once the pipeline crews are laid off? That will depend partly on whether other big resource projects are ready to begin construction at that time. However, if the government decides that Canada should have a pipeline, it will automatically assume responsibility for smoothing the impact of construction on the economy. If the pipeline appears to create an inflationary boom, for example, then the government will have to introduce such measures as tax increases, cuts in spending, wage and price controls, or even foreign exchange controls to prevent undue economic dislocation. However, once the project is finished, these policies would have to be reversed to get the economy back on a stable growth path. In other words, the construction phase may bring big benefits, but Canadians may also have to make some sacrifices.

Chapter 7. Pipeline Operation: Managing Canada's Wealth

Even if construction of the pipeline is manageable, the Canadian government must still decide whether the country needs a pipeline and, if so, *when*? The answer to the first question will probably be affirmative because Canada will need natural gas from the Arctic for its own use by the 1980s. But the timing will be a more difficult decision. Arctic Gas would like to begin building the pipeline in the winter of 1975/76. This pipeline would carry 50 percent Alaskan gas and 50 percent Mackenzie gas, and most, if not all, of the output would be sold in the United States. However, it may be worthwhile for Canada to delay construction until the 1980s, when it will need Mackenzie gas for its own use. Delaying the pipeline would have some benefits — mainly one of conserving energy for Canadians — but it would also have some drawbacks because Canada would forego the earnings generated by transporting Alaskan gas over Canadian terrain. Another drawback would be that a pipeline for strictly Canadian use would be smaller and therefore the costs of transportation would be higher.

Another major question facing the Canadian government is one of economic rent. Economic rent is the capital gain made when a resource, which is worth nothing in the ground, is produced and sold. Some of this capital gain goes to oil companies because they have taken the risks and invested the capital. But any gain remaining after the industry has taken an adequate profit should go to the Canadian people as owners of that resource. They can take their share in the form of royalties, income taxes, or reduced prices for the resource. A federal energy study has indicated that "the current system of income tax and royalties is not sufficiently flexible to obtain an equitable share of economic rent in all circumstances." And so the government is reconsidering its tax laws and royalties, and it has introduced a two-price system for oil which should direct some of the economic rent to Canadians. If the economic rent is collected, operation of the pipeline could bring a great deal of new wealth to Canada while delivering energy to people who need it.

But the pipeline could still have a detrimental impact on the country's economic structure, so it is important to gauge the full costs of resource development. The most significant side effect is that Canada could have substantial net foreign exchange earnings from the export of Mackenzie gas and transportation fees on Alaskan gas. (These earnings would be reduced by almost half if Canada bought one-quarter of the output of the line.) The important point is that these foreign exchange earnings would inevitably put upward pressure on the exchange rate. Such an increase would create serious problems for other Canadian industries, particularly manufacturers that either export their production or face competition from imports. Another side effect would be the rise in energy costs as expensive new supplies of energy come on the market. These costs would make it more difficult for Canadian energy users to compete with foreign companies. Most foreign companies will also be facing rising energy costs, but the matter is of such concern in Canada that the government has adopted a two-price system for oil to protect Canadian consumers. A similar two-price system could be introduced for natural gas exports.

The impact of the higher exchange rate and higher energy costs on Canadian manufacturing is of great concern because the country is trying to develop a balanced industrial base, which includes manufacturing as well as resources. It will be up to the federal government to establish policies that will collect the economic rent from energy projects and at the same time lead to balanced economic development.

Chapter 8. North American Relations: Striking a New Balance

Canada's measured approach to Arctic energy development reflects its desire to pursue its own national interest, but this approach could lead to some friction between the United States and Canada because of the United States' urgent need for new energy supplies. Both countries have adopted a more arm's-length approach to their economic and trade relations in the past few years, and this trend away from the old continental approach seems likely to continue. However, the two countries have mutual interests in the sphere of energy which could provide a basis for cooperation:

- Both countries need natural gas from the Arctic — the United States as soon as possible and Canada in the 1980s.
- Both countries also face the problem of continuity of supply of imported oil from overseas to their respective east coasts.
- Canada may eventually find that it has a large surplus of natural gas and oil, and if it does, it would make sense to sell this surplus at a profit. Before Canada can make such sales, however, it must prove that the geologists' optimistic estimates about the Arctic's energy potential are correct.

If there is a surplus to be sold, then the two countries must find a way of accommodating two problems on which they seem to have incompatible interests: the exchange rate and the pricing of Canadian exports. It might suit American export interests, for example, if the exchange rate for the Canadian dollar increased as a result of energy trade because this would make American manufactured goods more competitive with Canadian goods. Of course, that would not suit Canada at all. On the pricing issue, Canada has already introduced a two-price system for oil which has displeased American officials, and as yet it is not clear what the long-range repercussions will be for Canada-U.S. relations. On both issues, the two countries will somehow have to find a compromise if major increases in energy trade are going to be feasible.

The conclusion of the study is that the two countries have mutual interests which would favour cooperative development of the Arctic energy potential. No matter how great that potential is, however, Canadian exports can serve only a small share of U.S. energy needs, and in the next few years of crisis, Canada will have no new production to sell to the United States. The two countries will therefore have to focus on the longer-range questions of how to solve exchange rate and pricing questions in a way that will be appropriate for all future energy projects. After all, the natural gas pipeline could be the first of many giant transportation systems bringing energy from the Arctic.

This study is the 36th publication of the Canadian American Committee. The Committee was founded in 1957 to study and comment on problems arising between the two countries, and it is composed of leaders of business, labour, agriculture, and the professions from both countries under the co-chairmanship of Robert Fowler and Augustine Marusi. It is sponsored jointly by the C.D. Howe Research Institute in Montreal and the National Planning Association in Washington. The author is the director of domestic policy studies of the C.D. Howe Research Institute.

Copies of the study can be obtained by writing to the C.D. Howe Research Institute, 2060 Sun Life Building, Montreal, Canada H3B 2X7, or to the National Planning Association at 1606 New Hampshire Avenue, N.W., Washington, D.C. 20009. The price is $4.00. An order form is enclosed.

University of Alberta Library
0 1620 0335 8262